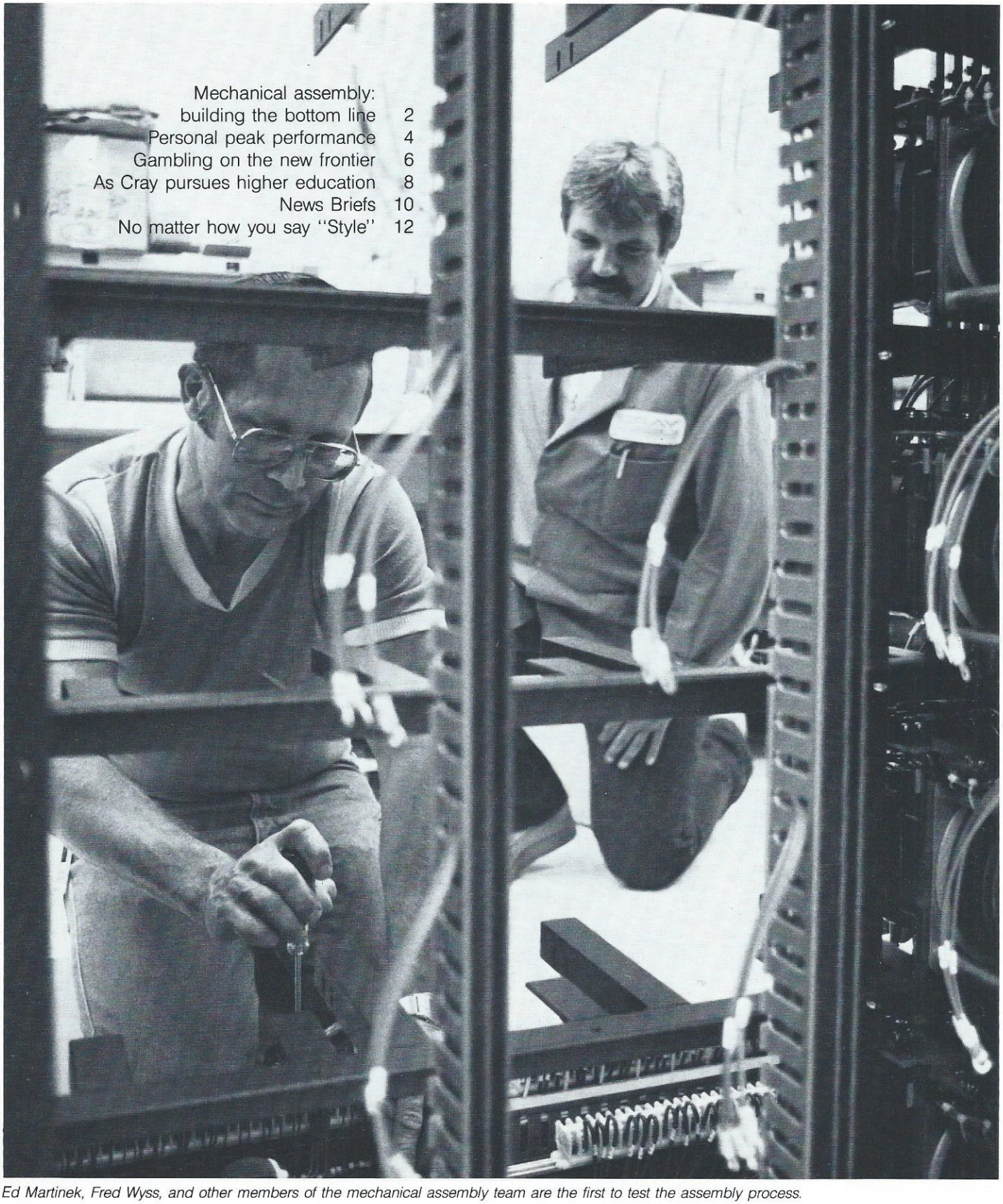
Interface

A CRAY RESEARCH, INC. PUBLICATION

SEPTEMBER 1986



Ed Martinek, Fred Wyss, and other members of the mechanical assembly team are the first to test the assembly process.

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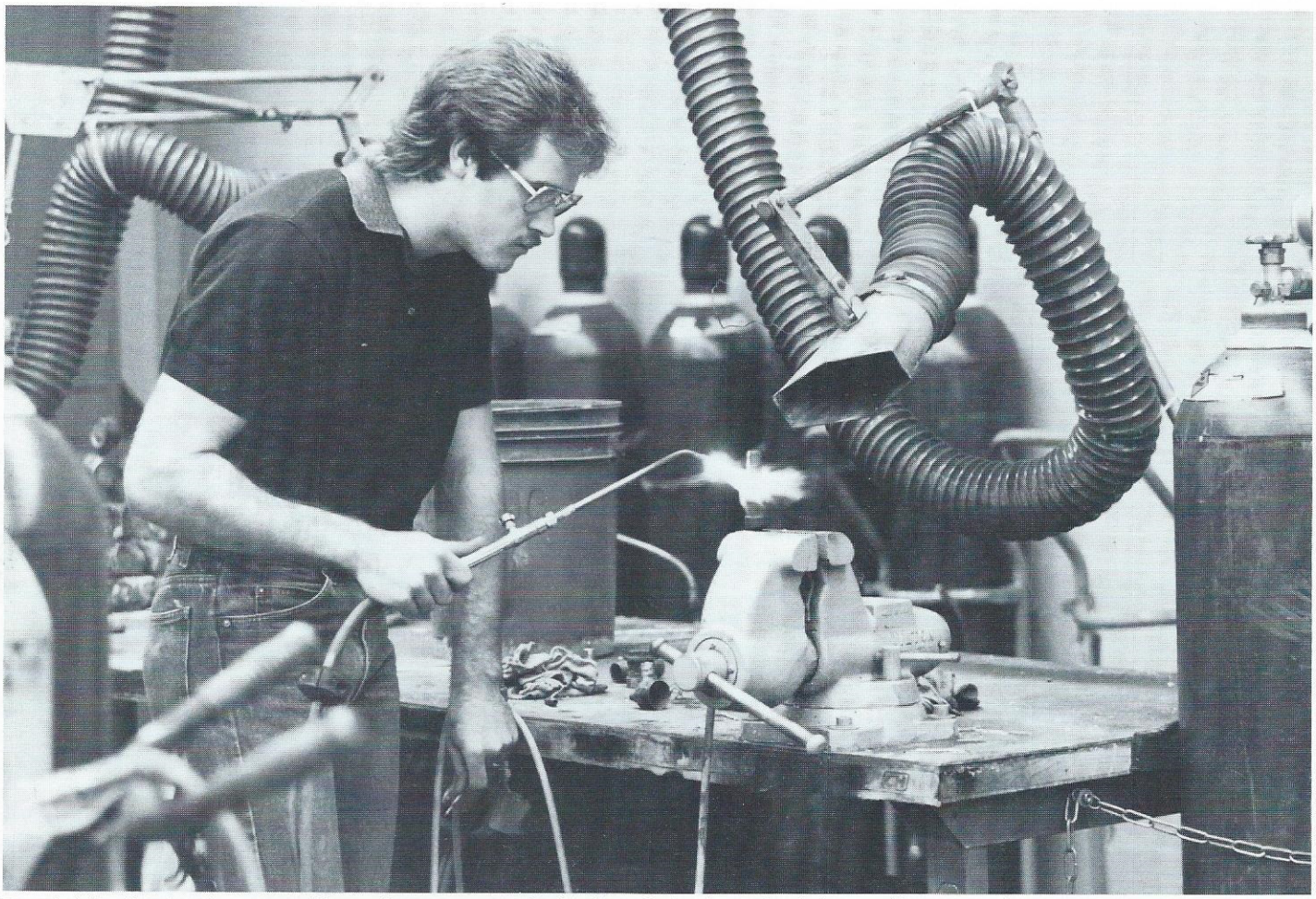


From building the chassis to assembling maintenance control units, Steve Soden in mechanical assembly supports the company's reputation for quality.

Mechanical assembly: building the bottom line

They are artists, technicians, advisors, and consultants. Cray's mechanical assembly team puts together the hardware for the world's fastest supercomputers. It's a big job with a direct impact on the company's success.

"On one hand, we are a manufacturing unit with a schedule to keep," explains department supervisor Fred Wyss. "We have products to deliver, deadlines to meet, and quotas to uphold. But unlike other manufacturing functions, mechanical assembly is a custom shop with capabilities that extend beyond the manufacturing process. We are planners and problem-solvers as much as assemblers, and our skills are used by several areas — development, manufacturing, and product continuation."

Putting the parts together

In 1979, the mechanical assembly group consisted of seven people whose primary responsibility was to assemble all mechanical parts except the modules for the finished computer. Seven years later, the group has not only grown in number, but also in its level of responsibility. Today, the 40 people who work in mechanical assembly are responsible for numerous mechanical functions — functions that extend from building the chassis to assembling maintenance control units for the CRAY X-MP and CRAY-2 systems.

The parts needed in manufacturing generally are not built by Cray Research. Most of the parts needed for hardware completion are built by outside vendors according to our specifications. Hardware parts are received, inspected, and stocked in inventory. They are released to mechanical assembly as needed for a project.

"Our first step," comments Steve Soden, mechanical technician, "is to look at the initial hardware parts for a project and then to examine the actual process of assembly. We check to see if the parts from the vendors could be improved, or to see if any changes could be made to streamline the manufacturing process."

The most brilliant supercomputer design would be useless if manufacturing could not assemble the pieces. "No one knows if an idea will work until the mechanical assembly group puts it together," explains Marc Schultz, production manager in Chippewa Falls. "Engineers count on the people in mechanical assembly to help put the hardware systems together correctly."

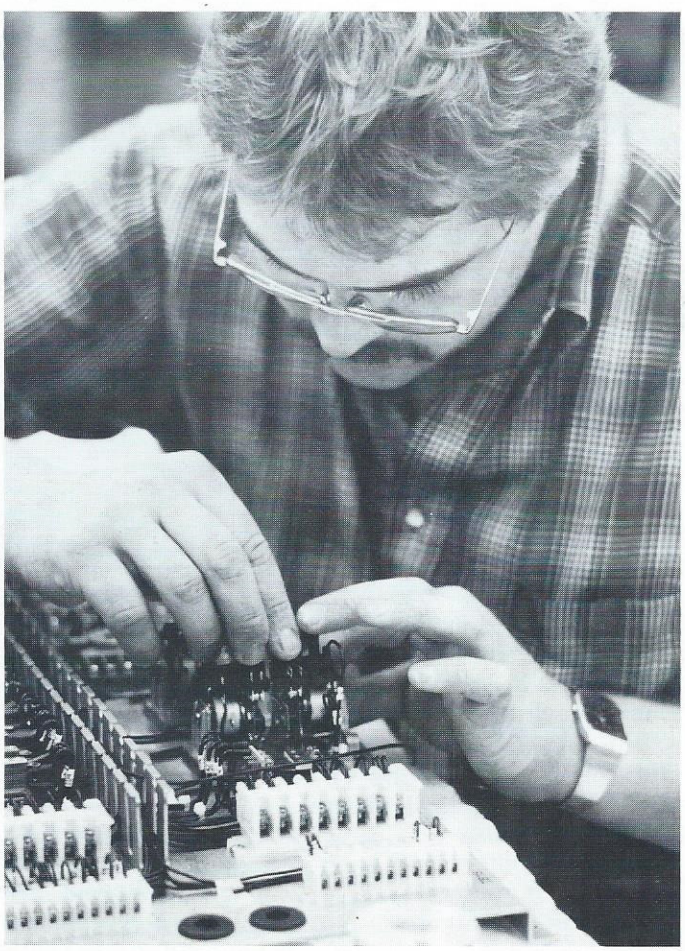
A system of support

Although some work is done on products in the development cycle, mechanical assembly focuses primarily on product enhancements. "We try to help the engineering group simplify the design and documentation for manufacturing purposes," says Fred Wyss. "We support them by working toward improvements on current product lines. For example, when an engineer comes up with a product modification, we build the modified equipment. Based on our experience with this first assembly, we make suggestions that could be useful in the manufacturing process."

Searching for optimal productivity

While engineers are interested in maximizing the performance of a product, people in manufacturing are concerned with building multiple systems — not just one. "The more efficiently we can assemble a system, the less it is going to cost the

Mechanical assembly team members like Micky Schroeder and Jim Caliebe work toward solutions that accommodate both design and production.



The mechanical assembly team provides precision assembly of Cray hardware products. Above: Chuck Yeager works on a relay panel for a power distribution unit.

"These are 'nuts and bolts' people — the people who build the fundamental hardware structure that holds the electronic system together."

Marc Schultz
production manager

company — and the better our cost margins will be," explains Gerald Russell, lead technician. "We want systems that can be manufactured and maintained as conveniently as possible."

People in mechanical assembly build equipment according to engineering specifications. At this point they focus on testing the equipment and checking the functions of the different systems. "If the hardware doesn't function as required," says Margaret (Micky) Schroeder, quality control coordinator, "we present the problem to engineering and work toward a solution that will accommodate the design as well as the production. We work together to make the change — and to achieve maximum productivity for Cray Research."

The mechanical assembly team provides precision assembly of Cray products and much more. In addition to building the hardware foundation for the world's fastest supercomputers, the group provides consultation, advice, and ideas. They are part of the company's reputation for quality products, and they continue to support innovative efforts.

Personal peak performance

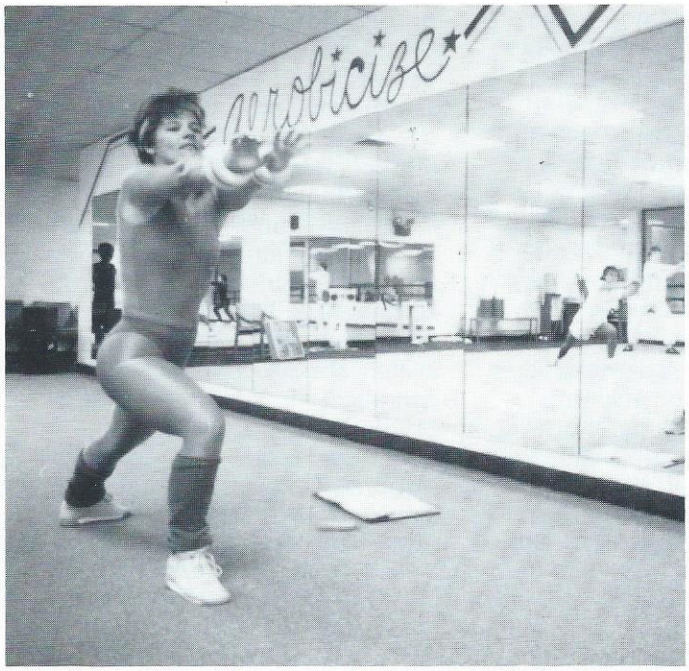
Whether you realize it or not, everyone participates in 86,400 seconds of physical conditioning each day — conditioning that comes from resisting gravity. For those who hate to exercise, this is good news. For others, it's an added bonus to an already active lifestyle.

Perhaps you remember the great feeling you had as a child after an invigorating swim or a tough game of volleyball. Fitness feels good.

People go through stages of fitness. If you are experiencing that stage where you don't know how to begin a new exercise program, try some of these tips from others at Cray Research. These people view fitness as a way of life rather than a chore. They have found that fitness is one way of achieving personal peak performance.

John Churchhouse, Julia Marshall, Richard Porter, and Andy Walker are employees of Cray UK. Their regular exercise routine helps them succeed in many ways, and part of their motivation comes from working out for worthy causes. "Last April we ran our first race — the Bracknell half-marathon," explains Julia. "Now we're preparing for a second bout in Windsor Great Park this October. Running in organized races makes you feel great physically; and you're usually raising money and visibility for a good cause. It's a boost in many respects."

Jill Nussbaum, senior accountant in Minneapolis, commits herself to a weekly fitness regime that includes participation in aerobics classes and bicycle riding. "Not only do I feel fit and healthy," admits Jill, "but regular exercise also helps me to achieve a generous measure of relief from daily stress. For me, exercise isn't something that I have to do — it's an enjoyable part of my daily routine that helps to increase my stamina and energy level for other activities."



Ultimate health comes from knowing your physical strengths and limitations, and adjusting your personal health program to your fitness ability. With this information, a person can tailor an enjoyable exercise program that fits personal needs and preferences. A firm believer in total-body workouts, Tom Huffcutt, human resources assistant in Chippewa Falls, is a runner, a basketball player, and a swimmer. "Exercise is probably my favorite hobby," says Tom. "It's fun, and my program is very well-rounded. I enjoy exercising because I vary my activities — I don't get bored. Working out is very important to me. If I don't do it, I just don't feel as healthy."

"Everyone is aware of the benefits of exercise," comments Betty Slade Christensen, Mendota Heights guest services coordinator. "The problem is finding time for it in a hectic work schedule. I joined a club that was close to my office so I can work out early in the morning or over the noon hour." Betty teaches aerobics twice a week and complements those workouts with Nautilus and swimming. "Getting into a regular routine is very important," she comments. "I recommend joining a club that's easily accessible — if you have to drive a long way, you just won't go."

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Gambling on the new frontier

Cray Research installed its first customer system just ten years ago. The events that led to that installation are an intriguing story of risk, negotiation, and compromise. For Los Alamos National Laboratory, their CRAY-1 computer was a first in a long history of frontier-breaking. For Cray Research, that first installation was a do-or-die maneuver that would mark a new era for computing or the end of a bright idea that didn't work.

An experienced customer

Los Alamos is no stranger to computing. As early as 1945, around the time of the first atomic explosion, Los Alamos began to use the ENIAC computer (Electronic Numerical Integrater and Calculator) at the University of Pennsylvania. ENIAC could perform in minutes what took days on the Lab's mechanical calculating machines. In 1952, the Lab built MANIAC (Mathematical Analyzer, Numerical Integrater, and Computer), a machine based on a design pioneered by John von Neumann. MANIAC was a major step in computer development, marking the progression from electromechanical to electronic operation.

Whenever possible, Los Alamos has taken advantage of the computer industry's most powerful offerings. That philosophy led to the procurement of Seymour Cray's CDC 6600 system in 1966 and his next machine, the CDC 7600, in 1970. Early in the 1970s, however, principals at the Lab were already searching for more computing power.

"We are always trying to project the Lab's future needs," said Bill Spack, associate C Division (Computing and Communications) leader at Los Alamos.

By sharing needs, ambitions, and ideas, Bob Holder of Los Alamos National Laboratory and Jim Merrell from Cray's Central Region reinforce the strong working relationship between the company and its first customer.

"We stay in touch with the major computer manufacturers, telling them how big our needs are and looking at what they have in development that might satisfy our requirements. Based on that kind of information, we anticipated that a next generation system (a significant step in power above the CDC 7600) would be available sometime in 1977. So we built that assumption into our budget planning."

While making a round of vendor visits in the fall of 1975, a group from Los Alamos called on Seymour Cray in his Chippewa Falls laboratory. "We knew of Seymour Cray from his work at Control Data," said Jack Worlton, Los Alamos Lab Fellow. "One of the problems for someone like Seymour starting his own company is being accused of taking proprietary work from his old employer. For whatever reason, Seymour decided to do something he had never done before: build a vector machine." The CRAY-1 computer would be four times as powerful as the CDC 7600. And much to their surprise, the Los Alamos group learned that a working prototype of this computer would be available by March of 1976.

Try before you buy

Cray Research knew that if its first installation was to be successful, the customer would need considerable computer expertise. "We had to be very careful where that first machine went," said John Rollwagen. "At the time, we thought there might be as many as a dozen potential customers with the historical experience necessary to handle our new computer."

Los Alamos wanted the new Cray system and had the kind of expertise to make it a good fit for the first installation. "I had been an advocate of vector processing for some time," said Jack Worlton. "I had even talked with CDC regarding vector capabilities for their Star 100 system. We had a contract for a Star, but the specifications changed significantly by the time it was ready for delivery. Then along comes Seymour with his new CRAY-1 machine, which was much advanced over the Star 100. It appeared to be just the ticket for us."

In the months following that visit to Chippewa Falls in 1975, representatives of Los Alamos, Cray Research, and the Energy Research and Development Administration (predecessor to the Department of Energy) spent a great deal of time working out details that would allow the CRAY-1 system to be installed. Los Alamos had budgeted for a new system in 1977, not 1976. Because the Lab was trying to procure a new system "out of cycle," the process became complicated. In addition, problems with the Star 100, which Lawrence Livermore National Laboratory had experienced firsthand, caused some apprehension over vector

processing and the "next generation" of computers.

Delays were frustrating to the young company, and even more frustrating to its primary founder. "Seymour finally broke the logjam," said John Rollwagen. "He offered to loan the system to Los Alamos, under certain restrictions, for six months. If the system met their requirements, they would pay us. If it didn't live up to expectations, they would send the machine back." Despite the low-risk aspect of Seymour's proposition, government procedures were still very clear on the requirement of competitive bids. To comply with those guidelines, and in fairness to other vendors, the "demonstration and evaluation" option was opened to any vendors interested in the arrangement.

By March of 1976, Cray Research was able to ship and install its first computer. A competitive procurement would be conducted at the end of the evaluation period. Los Alamos was able to assume a minimal risk and keep within government guidelines. Cray Research, on the other hand, had laid its last card on the table. "Cray was putting everything it had on a truck and shipping it to the mountains of New Mexico," Bill Spack said. Indeed, aside from lab equipment and office furniture, the CRAY-1 system was the company's only real asset. "We had used up our venture capital, so we needed to find a home for serial number 1 very quickly," Rollwagen remembers. "It was a critical time. If the machine hadn't performed, Cray Research wouldn't have continued as a company."

Guinea pigs and new frontiers

The first CRAY-1 computer was delivered without software. Dean Roush, now vice president of engineering, handled the site planning and mechanical installation along with Jack Williams, another early Cray employee. "We had our problems," Dean said. "We ran into copper shavings, problems with refrigeration lines, things like that. But considering it was our first machine, we didn't run into anything too serious. We weren't as nervous about the installation as we were prior to that time — when it wasn't certain whether or not we would find a customer for our first product."

Once the machine was installed, Lab staff and Cray employees worked together to make it functional. They had six months to get results that would justify keeping the system, and both parties had a stake in making the effort successful.

The Lab worked with a rudimentary operating system called BOS (benchmark operating system). A FORTRAN compiler for the system didn't exist at the time, so Los Alamos modified a compiler on the CDC 7600 that generated Cray code. The benchmark results were enough to evaluate the new system fairly, and Los Alamos conducted its competitive procurement with Cray Research and two other vendors.

Cray Research won the bid. Serial number 1 went "on revenue" in October of 1976, infusing new life into Cray Research and beginning a relationship that resulted in the installation of seven Cray systems at Los Alamos over the past decade.

Compatible philosophies, mutual benefits

Los Alamos has continued to go its own direction with software. Norm Morse, the Lab's current C Division leader, was charged early on with the responsibility of porting an operating system to the Lab's CRAY-1 system. The operating system that emerged was the Cray Time Sharing System (CTSS), a successor to the Livermore Time Sharing System developed at the Lawrence Livermore National Laboratory and the National Magnetic Fusion Energy Computer Center.

Los Alamos also developed the Common File System, a mass storage program for Cray computer systems. Both CTSS and the Common File System are now in the public domain, the latter currently being used by more than 15 user sites.

In addition to the pioneering work the Lab has accomplished and shared with others in the supercomputer community, Los Alamos provides valuable input for Cray Research product development. Los Alamos was the first site to receive an SSD storage device and now is evaluating the first release of CFT77, Cray's latest generation FORTRAN compiler.

In many ways, the success of the relationship between Los Alamos and Cray Research can be attributed to the guiding philosophies of both organizations. The mission of Cray Research is to build the world's most powerful general-purpose computers. The mission of Los Alamos is to accomplish research for national security and other advancements, which requires the use of the most sophisticated tools available.

Los Alamos has been tackling the most challenging problems at the frontiers of science for more than 40 years. Cray Research has had a part in the last decade of that adventure. According to Norm Morse, a new Cray system at the Lab is fully utilized within two weeks of installation; Los Alamos still needs more power. As long as that need continues, and as long as customers like Los Alamos continue to provide valuable feedback, Cray systems will no doubt continue to find a home in the mountains of New Mexico.

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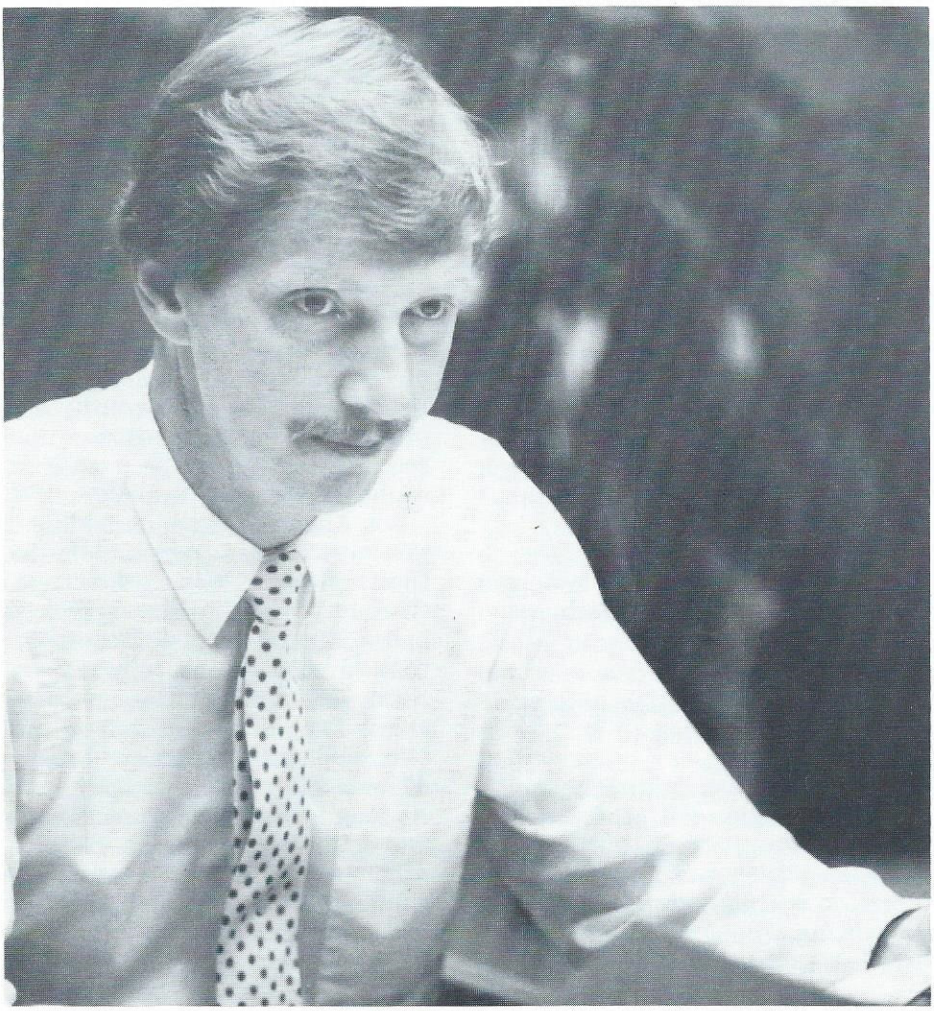
As Cray pursues higher education

On February 25, 1985, the National Science Foundation (NSF) awarded grants of about $200 million to establish supercomputing centers at four U.S. universities. Two of these four centers, the University of Illinois at Urbana-Champaign and the University of California at San Diego, ordered Cray computers. When a fifth center was established at Carnegie-Mellon in 1986, they too selected a Cray computer.

More than ever before, universities in the United States are recognizing their need for state-of-the-art research computer capabilities. By the end of 1985, Cray Research had installed, or had on order, systems at ten university sites. By the end of 1986, that number will expand to eighteen. In one year, the university marketplace for Cray Research will have grown by 80 percent.

The NSF initiative is creating new market opportunities in the United States for Cray machines. Funds now are attainable for building supercomputer centers at universities across the country. "The university market has the potential to provide a major impact on Cray's future. Support of advanced research through funding by federal agencies, state government, and local industries has helped boost the marketplace," explains Director of University Marketing Derek Robb.



Director of University Marketing Derek Robb

"For Cray Research, this means that we have the opportunity to sell more systems, and we are enhancing the company's image as the leading supplier of high-performance computers in all areas of computational research."

The significance of our systems

University computing centers have proven capabilities in research — capabilities that extend far beyond the classroom walls. By developing cooperative research and development projects with select universities, Cray Research is ensuring a return on its R&D investment and is demonstrating the value of supercomputing in many new areas.

"When we sell a system to a university center," comments Zellars West, district marketing manager in the Pittsburgh office and the person responsible for the Carnegie-Mellon account, "we are expanding our own opportunities in several ways. First, the project being worked on and the system being used become common knowledge — we're enhancing our public image. Second, we have the opportunity to develop new trends. As university students and faculty become more familiar with Cray computers, they will want to use those tools as they move on to work in various industries. They will push for more super-computers within industry, and some may eventually become buyers of systems. Finally, Cray Research will benefit when hiring better-trained graduates."

The needs of a special market

In addition to providing tools, Cray Research contributes financially to advanced research. "In the case of university

marketing, flexibility is very important. You are working in a market that is constantly short of funds," explains Derek Robb. "Anything that you can do to provide funding is greatly appreciated. If money and resources are available, research projects will move ahead, including projects of interest to Cray Research."

Last year, three National Science Foundation centers received grants from Cray Research. Each grant was for $750,000. "The projects we support are highly varied — ranging from artificial intelligence to the physical sciences," says Central Region salesman Rene' Copeland, who manages the account at the University of Illinois. "Universities are excellent sources of ideas, algorithms,* and prototype software. In addition to helping develop new application programs, university customers work on systems and networking development projects that complement Cray's work. They also have the capability to develop parallel processing tools and algorithms to hasten the acceptance of multitasking. The R&D grant program has proven very successful."

A future market

With a large number of prospects in sight, the university marketplace is very active. In fact, over the next two years, at least twenty prospects are in the market picture for Cray Research. As in other areas involving supercomputing, however, Cray Research is no longer alone — the industry is becoming highly competitive. ETA plans to install their first three systems at university sites in the United States, and NEC and Amdahl/Fujitsu are already very active in the university market in Japan and the United States. To remain successful, Cray Research must continue to focus on its reputation for providing outstanding equipment and service to its customers — customers who are becoming increasingly sophisticated in their needs and knowledge.

*Note: An algorithm is a fixed step-by-step software procedure for accomplishing a given result. Usually it is a simplified procedure for solving a complex problem in a finite number of steps.

Cray university sites
(August 1986)

United States

Customer	Model
Carnegie-Mellon and University of Pittsburgh (Pennsylvania)	CRAY X-MP/48
San Diego Super-Computer Center/ GA Technologies (San Diego)	CRAY X-MP/48
University of Texas System (Austin)	CRAY X-MP/24
University of Illinois (Urbana)	CRAY X-MP/24
University of Minnesota (Minneapolis)	CRAY-1/A CRAY-2

International

Customer	Model
Centre de Calcul Vectoriel pour la Recherche (France)	CRAY-1/S (to be replaced with CRAY-2)
Cineca (Italy)	CRAY X-MP/12
Ecole Polytechnique Federale-Lausanne (Switzerland)	CRAY-1/S
Konrad Zuse-Zentrum Fuer Informationstechnik Berlin (West Germany)	CRAY-1/M
Regionales Rechenzentrum der Universitate Stuttgart (West Germany)	CRAY-1/M
University of London Computing Centre (United Kingdom)	CRAY-1/S

News Briefs

Cray computer ordered by Conoco

On August 5, Cray Research announced that a CRAY X-MP/14 supercomputer was installed in July 1986 for Conoco, Inc. at the company's Ponca City, Oklahoma facility. The system was purchased.

Conoco will use the system for advanced seismic processing and reservoir modeling in support of the company's petroleum exploration and production efforts.

A subsidiary of the DuPont Company, Conoco is one of the world's largest producers of energy — oil, natural gas, and coal — and a major refiner and marketer of petroleum products.

ARCO to upgrade

On August 28, Cray Research announced that ARCO Oil and Gas Company of Dallas, Texas, has ordered a CRAY X-MP/28 computer system and Solid-state Storage Device. The system will be leased and will be installed as an upgrade to a CRAY X-MP/24 now being used by ARCO. The system upgrade will be installed in the third quarter of 1986 at the ARCO Exploration and Technology Company in Plano, Texas. ARCO Oil and Gas company, a division of Atlantic Richfield Company, explores for, produces and sells oil, natural gas and natural gas liquids in North America.

First CRAY-2 for France

Cray Research announced on August 19 that a CRAY-2 supercomputer valued at approximately $18.9 million has been ordered by Groupement pour un Centre du Calcul Vectoriel pour le Recherche, a consortium of French educational and governmental research organizations. The system, which will be purchased, will be housed in the consortium's computer center at L'Ecole Polytechnique, an engineering school in the Paris area.

The CRAY-2 system will be installed in the first quarter of 1987, pending export license approval. It will replace a CRAY-1 S/1000 installed in 1983.

The consortium currently has eight members involved in a range of scientific research. The Cray supercomputer will be used for academic, meteorological, aerospace, mathematical, oceanographic, and non-nuclear military research.

German physics institute orders CRAY X-MP system

On August 19, Cray Research announced that the Max-Planck Gesellschaft (MPG) has ordered a CRAY X-MP/24 supercomputer to be installed in the second quarter of 1987, pending export license approval. The system, valued at approximately $8.9 million, will be purchased. It will be installed at the computer facility of the Institute for Plasma Physics (IPP) in Garching, near Munich.

MPG has been a longtime Cray customer, having installed a CRAY-1 system in 1979. The CRAY X-MP system will be used for high energy physics, astrophysics, and basic scientific research.

Improvements on CRAY X-MP system: models added to product line

On August 4, Cray Research announced a 12 percent improvement in CPU performance for the CRAY X-MP series of computer systems. In addition, the company announced price reductions on all one- and two-processor CRAY X-MP systems and introduced two new models in the CRAY X-MP product line: a four-processor, four-million word CRAY X-MP system, and a two-processor, two-million word CRAY X-MP system. These two models bring the CRAY X-MP product line to a total of 11 models, ranging in price from $4 million to $16 million.

Clock cycles for new CRAY X-MP systems have been reduced to 8.5 nanosecond (nsec) from 9.5 nsec. The faster clock period increases scalar, vector, and memory speeds, resulting in a significant improvement in overall CPU performance. The enhanced CRAY X-MP computer systems are fully compatible with existing CRAY X-MP models and run the same operating systems, compilers, and applications as previous CRAY X-MP products. Existing user programs can take advantage of the faster clock and new model sizes without modification. With these performance improvements and price reductions, customers realize a four-fold improvement in the price/performance of CRAY X-MP computer systems over the original CRAY-1 system introduced in 1976.

New fiber optic link

Providing easier integration into customer environments, Cray Research has introduced a new

3-Mbyte/sec fiber optic link option that allows the connection between a Cray mainframe and a front-end system to span one kilometer (.621 miles) with complete electrical separation from the user's Cray system. This compares with the previous maximum distance of 450 feet (137 m).

UNITE in Chippewa Falls and Mendota Heights

UNITE (University-Industry Television for Education) is an accredited program for continuing education of scientists, engineers, and technicians. This interactive video and audio program is broadcast from the University of Minnesota and will be available to Cray employees in Chippewa Falls beginning in January of 1987. Courses are planned for Mendota Heights beginning spring quarter 1987. Chippewa Falls classrooms will be in the Systems facility, and Mendota Heights classrooms will be in the 1440 facility.

UNITE is designed to help working professionals obtain graduate degrees without traveling to the University. Participants view live classroom presentations, ask questions of the instructors, take examinations, and receive grades and credits accordingly. Degrees can be pursued in aerospace engineering, chemistry, chemical engineering, computer science, electrical engineering, materials science, or mechanical engineering. It is also possible to complete a master of engineering degree, or take courses with no degree interest. Besides offering accredited graduate courses, UNITE broadcasts colloquia in many disciplines and offers prerequisite courses, such as beginning calculus.

If you wish to register for UNITE courses, you may apply for admission to a graduate program or take courses as an adult special student. If you are interested in the degree program, you must take at least 60 percent of your coursework in an academic division. No more than 40 percent can be transferred from adult special courses.

For further information on UNITE, contact Julie Marlette in Chippewa Falls (ext. 1608) or Tessa Haas in Mendota Heights Training (ext. 302).

Can you keep a secret?

During the Second World War the Navy's shipbuilding program had a stylized slogan of "Loose Lips Sink Ships." This was just another way of expressing the "need-to-know" philosophy underlying all aspects of a good security program. This philosophy can and should be applied to the dissemination of Cray information as well.

You generally know whether or not an individual has a "need-to-know." If the need exists, share the information with that individual to the extent necessary. It is always helpful to note that the information is company private and should not be passed along to others. This applies to both verbal and written information — even if the information has become public knowledge and has been discussed or printed by the media.

If a "need-to-know" does not exist, simply note that it is company-private information. If the person is persistant, you might refer him or her to the Corporate Security Office (ext. 3453) in Mendota Heights.

Correction

The August issue of *Interface* discussed our goals and progress for 1986. In one of the progress reports, we noted that a pre-release of UNIX System V Release 2 had been delivered. Oops! What it should say is that a pre-release of UNICOS Release 2 had been delivered. UNICOS is derived from UNIX System V, but is not and cannot be called UNIX. Many thanks to Jack Thompson for pointed out this error.

Not your ordinary review

If you're looking for some interesting and educational reading, ask for the book *The Winning Performance*, by Donald K. Clifford, Jr. and Richard E. Cavanagh. Published by Bantam Books, Inc., *The Winning Performance* offers an account of how America's high-growth, midsize companies succeed. Cray Research is among their examples.

Market timing, innovation management, competition, and quality are familiar themes. As business consultants, Clifford and Cavanagh offer subjective interpretations of what factors contribute to a company's success. Their assessment is carefully researched and clearly documented. Even for those who work for Cray Research, the book provides insights into our achievements and future challenges.

As a best-selling management book in the United States and the number three best-seller in Japan, *The Winning Performance* is a valuable resource for successful development. Already available in English and Japanese, the book currently is being translated to German, French, Swedish, Italian, and Dutch.

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No matter how you say "Style"

When *The Winning Performance* was translated to Japanese, Cray Research and the Cray Style took on new form. To see how closely the Japanese Cray Style resembles the English version, a translator — unfamiliar with the Cray Style — was employed to translate the document back to English.

The translation succeeds in capturing the fundamental beliefs found in our Style, and offers a delightful interpretation of Cray Research, its people, and its values.

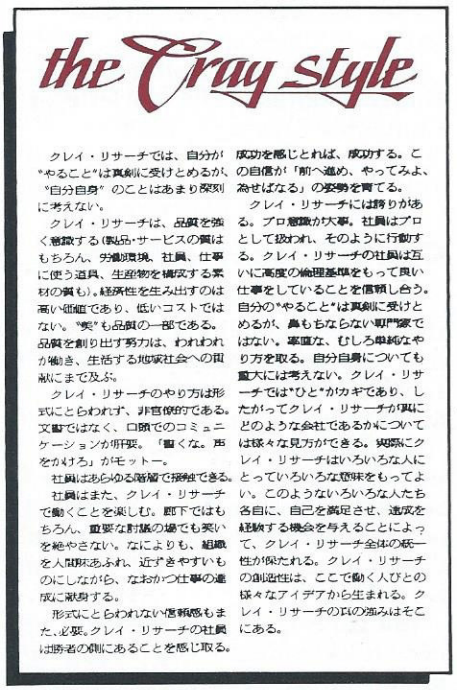
The Cray Style (translated from Japanese to English)

At Cray Research, people take what they do seriously, but they don't get all caught up in themselves.

Cray Research is highly conscious of quality — not only the quality of its products and of the services it provides, but also the quality of its working environment, of its employees, of the instruments used to perform work, and of the materials comprising the finished product. Cray Research believes that it is high value, and not low cost, that yields economy and efficiency. That "beauty" is also one component of product quality. Cray Research is motivated by a desire to produce quality, and this endeavor ultimately results in contributions to everyone's daily lives.

Cray Research's way of doing things is not caught up in formality — it is not bureaucratic. Oral communication takes precedence over written documents. "Call — don't write" is their motto.

Cray employees interact with people from all levels of the company and they take pleasure in working at Cray Research. In the corridors, even in places where important discussions take place, laughter does not seem to die out. Above all, it is the human touch that permeates the organization, and while getting to know their colleagues, Cray employees can still devote themselves to accomplishing the tasks at hand.



the Cray style

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クレイ・リサーチのやり方は形式にこだわれず、非官僚的である。文書ではなく、口頭でのコミュニケーションが明要。「書くな。声をかけろ」がモットー。

社員はあらゆる階層で接触できる。

社員はまた、クレイ・リサーチで働くことを楽しむ。廊下ではもちろん、重要な討議の場でも笑いを絶やさない。なによりも、組織を人間味あふれ、近づきやすいものにしながら、なおかつ仕事の達成に献身する。

形式にこだわれない信頼感もまた、必要。クレイ・リサーチの社員は勝者の側にあることを感じ取る。成功を感じとれば、成功する。この自信が「前へ進め、やってみよ、為せばなる」の姿勢を育てる。

クレイ・リサーチには誇りがある。プロ意識が大事。社員はプロとして扱われ、そのように行動する。クレイ・リサーチの社員は互いに高度の倫理基準をもって良い仕事をしていることを信頼し合う。自分の"やること"は真剣に受けとめるが、鼻もちならない専門家ではない。率直な、むしろ単純なやり方を取る。自分自身についても重大には考えない。クレイ・リサーチでは"ひと"がカギであり、したがってクレイ・リサーチが真にどのような会社であるかについては様々な見方ができる。実際にクレイ・リサーチはいろいろな人にとっていろいろな意味をもってよい。このようないろいろな人たち各自に、自己を満足させ、達成を経験する機会を与えることによって、クレイ・リサーチ全体の統一性が保たれる。クレイ・リサーチの創造性は、ここで働く人びとの様々なアイデアから生まれる。クレイ・リサーチの真の強みはそこにある。

At Cray, it is also thought that a feeling of mutual reliance and trust — not caught up in formalities — is necessary. Cray employees feel that they are on the winning side. And you know that if you feel successful, you will succeed. This confidence at Cray fosters an attitude of let's go forward, see what we can do and what happens will happen.

There is pride at Cray Research. The feeling of professionalism is taken seriously. Employees are treated as professionals and act accordingly. The employees all know and rely on the fact that the work is being done well because the standards are so high. Employees take what they do seriously, yet they are not pretentious specialists. They take a straightforward, or perhaps even simple approach to their work. They don't attach importance to themselves.

At Cray Research, the individual is the key. Consequently, if you ask what Cray Research is really like, you get many different responses. It has different meanings for different people. For each of these respective individuals, though, the one thing that is a common thread is that work at Cray Research satisfies the individual and provides an opportunity to experience accomplishing something important. Cray Research's creativity springs from the minds of the people who work there, and that is where Cray Research's real strength lies.

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Telephone (612) 333-5889

Jean Egerman, Editor
Kate S. Neessen, Contributing Writer
Eric Hanson and Cynthia Rykken, Graphics